

REMARKS/ARGUMENTS

The examiner is thanked for the performance of a thorough search. By this amendment, Claims 1, 22, and 48 have been amended. No claims have been cancelled or added. Hence, Claims 1-2, 4-14, 16, 21-23, 25-35, 37, 39-42, 46, 48-49, and 51-61 are pending in the application. The amendments to the claims as indicated herein do not add any new matter to this application. Each issue raised in the Office Action mailed March 11, 2010 is addressed hereinafter.

I. ISSUES NOT RELATING TO CITED ART—CLAIM AMENDMENTS

Claim 1 now recites “wherein the two or more methods of accessing said one or more XML resources from said database repository include accessing said one or more XML resources through an index and accessing said one or more XML resources without using the index”, which is amply supported in the specification, at least by paragraph [0022]. Claims 22 and 48 also now recite the above-cited feature, and are supported in the specification for at least the same reasons as Claim 1.

II. ISSUES RELATING TO CITED ART**A. CLAIMS 1, 4-14, 16, 21-22, 25-35, 37, 39, 42, 46, 48-49, AND 51-61**

Claims 1, 4-14, 16, 21-22, 25-35, 37, 39, 42, 46, 48-49, and 51-61 are rejected under 35 U.S.C. § 103(a) as being unpatentable over “Estimating the Selectivity of XML Path Expressions for Internet Scale Applications”, by Aboulmaga et al. (“Aboulmaga”) in view of U.S. Patent No. 6,427,123 to Sedlar (“Sedlar”). The rejection is respectfully traversed.

Claim 1

Claim 1 recites:

A method comprising the computer-implemented steps of:
 gathering statistics by a database server about nodes that are stored in a database repository that is managed by the database server;
 wherein said nodes form a hierarchy;
 wherein each node is either an XML file or an XML file container;
 wherein at least one node in the hierarchy is an XML file container that contains a plurality of XML files, each of which contains a plurality of XML elements;
 storing said statistics; and
 in response to a request to the database server for access to one or more XML resources from said database repository, the database server computing a computational cost associated with each of two or more methods of accessing said one or more XML resources from said database repository, based on said statistics;
wherein the two or more methods of accessing said one or more XML resources from said database repository include accessing said one or more XML resources through an index and accessing said one or more XML resources without using the index;
 wherein the method is performed by one or more computing devices;
 wherein XML files of said nodes are XML resources, and wherein the step of computing a computational cost comprises (a) computing a selectivity value for each of one or more predicates, from said request, that contain operators on said database repository and (b) **computing a computational cost of traversing, to locate a particular XML resource specified in said request, an index in which said XML resources are indexed to said database repository.**

At least the above-bolded features of Claim 1 are not taught or suggested by Abounlaga or Sedlar, even when taken in combination under 35 U.S.C. § 103(a).

The Office Action cites Abounlaga, section 2, last paragraph, as allegedly teaching “in response to a request to the database server for access to one or more XML resources from said database repository, the database server computing a computational cost associated with each of two or more methods of accessing said one or more XML resources from said database repository, based on said statistics” recited by Claim 1. However, the cited portion of Abounlaga fails to teach or suggest “wherein the two or more methods of accessing said one or

more XML resources from said database repository include accessing said one or more XML resources through an index and accessing said one or more XML resources without using the index” recited by Claim 1, as amended.

Aboulmaga describes methods of summarizing the structure of XML data such that the summary can be fit into a small amount of space. (See Aboulmaga Abstract.) Such a summary can be used to estimate the selectivity of simple XML path expressions over complex large-scale XML data. (See *Id.*) Aboulmaga fails to teach or suggest computing a computational cost associated with each of two or more methods of accessing said one or more XML resources, where the two or more methods **“include accessing said one or more XML resources through an index and accessing said one or more XML resources without using the index”**, as recited by Claim 1. In fact, Aboulmaga does not describe accessing XML resources through an index at all, let alone computing a computational cost associated with accessing XML resources through an index, based on the statistics recited by Claim 1.

Furthermore, the Office Action cites Aboulmaga, section 2, first and fourth paragraphs, as allegedly teaching “computing a computational cost of traversing, to locate a particular XML resource specified in said request, an index in which said XML resources are indexed to said database repository” recited by Claim 1. This is incorrect.

Aboulmaga, section 2 first paragraph, describes a pruned suffix tree data structure that “stores all the strings in a database and all their suffixes”, and in which “nodes corresponding to low frequency strings are pruned”. This description of a generic data structure in which information about the structure of XML data may be stored is insufficient to teach or suggest “an index in which said XML resources are indexed to said database repository” recited by Claim 1 because a pruned suffix tree data structure does not explicitly, nor inherently, index

XML resources. A pruned suffix tree described in Abounaga merely stores a pruned set of strings.

Abounaga, section 2, fourth paragraph, describes methods of summarizing the structure of XML data by constructing graphs that represent the structural summaries of the data. Abounaga indicates that the selectivity of XML path expressions may be derived using such summaries. The description in Abounaga of summarizing the structure of XML data in graph format is insufficient to teach or suggest “an index in which said XML resources are indexed to said database repository” recited by Claim 1.

Therefore, Abounaga certainly fails to show computing a computational cost of traversing such an index as recited by Claim 1 to locate a particular XML resource specified in a request. It is not even alleged that Sedlar describes the above-cited features of Claim 1. Reconsideration is respectfully requested.

Claim 9

Claim 9 recites, in part, “each of said XML resources is stored, in association with a location of a node in said hierarchy, in a column of a table in said database repository, and wherein an operator contained in at least one of said one or more predicates is an operator that determines whether a particular XML resource can be located in said database repository through a particular specified path through a portion of said hierarchy.”

The Office Action does not even allege that the above-cited feature of Claim 9 is shown in the art. With respect to Claim 9, the Office Action merely relies on the arguments presented for Claim 1. However, **the above-cited feature of Claim 9 is not in Claim 1.** Furthermore, Abounaga fails to teach or suggest a predicate that contains an operator “that determines whether a particular XML resource can be located in said database repository through a

particular specified path through a portion of said hierarchy” recited by Claim 9.

Reconsideration is respectfully requested.

Claim 10

Claim 10 recites, in part, “each of said XML resources is stored, in association with a location of a node in said hierarchy, in a column of a table in said database repository, and wherein an operator contained in at least one of said one or more predicates is an operator that determines whether a particular XML resource can be located in said database repository at a terminal location of a particular specified path through a portion of said hierarchy.”

As with the feature of Claim 9, the Office Action does not even allege that the above-cited feature of Claim 10 is shown in the art. With respect to Claim 10, the Office Action merely relies on the arguments presented for Claim 1. However, **the above-cited feature of Claim 10 is not in Claim 1.** Furthermore, Abounaga fails to teach or suggest a predicate that contains an operator “that determines whether a particular XML resource can be located in said database repository at a terminal location of a particular specified path through a portion of said hierarchy”, as recited by Claim 10. Reconsideration is respectfully requested.

Claim 42

Claim 42 recites, among other things, “wherein XML files of said nodes are XML resources, and wherein the step of computing a computational cost comprises (a) computing a selectivity value for each of one or more predicates, from said request, that contain operators on said database repository and (b) computing a computational cost of traversing, to locate a particular XML resource specified in said request, an index in which said XML resources are indexed to said database repository.” This feature of Claim 42 is substantially similar to the

feature of Claim 1 cited above. As such, Claim 42 is patentable over the cited art for at least the same reasons as Claim 1. Reconsideration is respectfully requested.

Claim 58

Claim 58 recites, among other things, “wherein XML files of said nodes are XML resources, and wherein computing a computational cost comprises (a) computing a selectivity value for each of one or more predicates, from said request, that contain operators on said database repository and (b) computing a computational cost of traversing, to locate a particular XML resource specified in said request, an index in which said XML resources are indexed to said database repository.” This feature of Claim 58 is substantially similar to the feature of Claim 1 cited above. As such, Claim 58 is patentable over the cited art for at least the same reasons as Claim 1. Reconsideration is respectfully requested.

Claim 59

Claim 59 recites:

A method comprising the computer-implemented steps of:
gathering statistics by a database server about XML files and XML file containers;
wherein the XML files and XML file containers are hierarchically stored in a
database repository that is managed by the database server;
**receiving a request to the database server for access, through a view, to one
or more XML resources;**
computing a selectivity value, based at least in part on the statistics, for a
predicate included in the request; and
determining a query plan based, at least in part, on the selectivity value;
wherein the method is performed by one or more computing devices;
**wherein the method further comprises computing a computational cost of
traversing, to locate a particular XML resource specified in said
request, an index in which said XML resources are indexed to said
database repository.**

At least the above-bolded features of Claim 59 are not taught or suggested by Aboulmaga or Sedlar, even when taken in combination under 35 U.S.C. § 103(a).

In rejecting Claim 59, the Office Action merely relies on the arguments presented for Claim 1. Thus, with respect to “receiving a request to the database server for access, through a view, to one or more XML resources” recited by Claim 59, the Office Action does not even allege that this feature is shown in the art because **this feature is not in Claim 1**.

In the arguments for Claim 1, the Office Action cites Aboulmaga, section 2, last paragraph, as allegedly teaching “a request to the database server for access to one or more XML resources from said database repository” recited by Claim 1. However, the cited portion of Aboulmaga fails to teach or suggest “receiving a request to the database server for access, through a view, to one or more XML resources” recited by Claim 59.

Aboulmaga, section 2, last paragraph, indicates that “cost models for query optimization in object-oriented databases depend on the selectivity of path expressions”. However, the cited portion of Aboulmaga fails to teach or suggest **a view** as recited by Claim 59. Therefore, Aboulmaga certainly fails to teach or suggest “receiving a request to the database server for access, **through a view**, to one or more XML resources”, as recited by Claim 59.

Claim 59 also recites “wherein the method further comprises computing a computational cost of traversing, to locate a particular XML resource specified in said request, an index in which said XML resources are indexed to said database repository”. This feature is substantially similar to the feature of Claim 1 cited above. As such, Claim 59 is patentable over the cited art for at least the same reasons as Claim 1. Reconsideration is respectfully requested.

Claim 51

Claim 51, which depends from Claim 1, recites “wherein the request to the database server for access to one or more XML resources is through a view”. This feature of Claim 51 is substantially similar to the above-cited feature of Claim 59. The Office Action cites

Abounaga, section 2, fourth paragraph, as allegedly teaching the features of Claim 51. This is incorrect.

Abounaga, section 2, fourth paragraph describes methods of summarizing the structure of XML data by constructing graphs that represent the structural summaries of the data. Such a description in no way teaches or suggests a request to a database server for access to one or more XML resources **through a view**, as recited by Claim 51. Therefore, Abounaga fails to teach or suggest the above-cited feature of Claim 51.

Also, because the above-cited feature of Claim 51 is substantially similar to the above-cited feature of Claim 59, Claim 51 is patentable over the cited art for at least the same reasons as those given in connection with the above-cited feature of Claim 59. Reconsideration is respectfully requested.

Balance of the claims

Independent Claims 22, 30, 31, 46, 48, and 61 are, variously, computer readable storage medium and system counterparts to Claims 1, 9, 10, 42, and 59, and are thus patentable over the cited art for at least the same reasons as Claims 1, 9, 10, 40, 42, and 59 given above. Furthermore, Claims 4-8, 11-14, 16, 21, 25-29, 32-35, 37, 39, 49, 51-57, and 60 each depend from one of these independent claims. Thus, these dependent claims are patentable over Abounaga and Sedlar for at least the same reasons as those discussed in connection with the independent claims upon which they depend. As is discussed above, these independent claims recite features that Abounaga and Sedlar do not disclose. Therefore, Claims 4-8, 11-14, 16, 21, 25-29, 32-35, 37, 39, 49, 51-57, and 60, which inherit these features, are patentable over Abounaga and Sedlar, even when taken in combination under 35 U.S.C. § 103(a). Reconsideration is respectfully requested.

B. CLAIMS 2, 23 AND 40-41

Claims 2, 23 and 40-41 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Aboulmaga in view of Sedlar and further in view of “Statistical Synopses for Graph-Structured XML Databases”, by Polyzotis et al. (“Polyzotis”). The rejection is respectfully traversed.

Claims 2 and 23 depend from independent Claims 1 and 22 discussed above, and are patentable over the cited references for at least the same reasons as those discussed in connection with these independent claims. As is discussed above, these independent claims recite features that Aboulmaga and Sedlar do not disclose. The Office Action does not even allege that Polyzotis discloses these features. Therefore, Claims 2 and 23, which inherit these features, are patentable over Aboulmaga, Sedlar, and Polyzotis, even when considered in combination, under 35 U.S.C. § 103(a). Reconsideration is respectfully requested.

Claim 40 recites:

A method comprising the computer-implemented steps of:
 gathering, by a database management system, statistics about how many nodes that are stored in a repository of said database management system satisfy certain criteria;
 wherein said nodes form a hierarchy;
 wherein each node is either an XML file or an XML file container;
 wherein at least one node in the hierarchy is an XML file container that contains a plurality of XML files, each of which contains a plurality of XML elements;
 wherein XML files of said nodes are XML resources;
 storing said statistics in said database management system;
 the database management system using the statistics to determine how to process a query that accesses one or more XML resources;
 wherein the method is performed by one or more computing devices; and
wherein the step of gathering statistics comprises gathering each of
 a total number of nodes, in said hierarchy, that are accessible via a
 path through a specified node,
 a total number of containers, in said hierarchy, that are accessible via
 a path through said specified node,
 a total number of nodes, in said hierarchy, that are accessible via a
 path through said specified node and that are in a level of said

**hierarchy that is immediately under a level of said specified node, and
a total number of containers, in said hierarchy, that are accessible via a path through said specified node and that are in a level of said hierarchy that is immediately under said level of said specified node.**

At least the above-bolded features of Claim 40 are not taught or suggested by Aboulmaga, Sedlar, or Polyzotis even when taken in combination under 35 U.S.C. § 103(a).

The Office Action cites Polyzotis, section 4.2.1, first paragraph, as allegedly teaching the following features, recited by Claim 40:

wherein the step of gathering statistics comprises gathering each of
a total number of nodes, in said hierarchy, that are accessible via a path through a specified node,
a total number of containers, in said hierarchy, that are accessible via a path through said specified node,
a total number of nodes, in said hierarchy, that are accessible via a path through said specified node and that are in a level of said hierarchy that is immediately under a level of said specified node, and
a total number of containers, in said hierarchy, that are accessible via a path through said specified node and that are in a level of said hierarchy that is immediately under said level of said specified node.

This is incorrect.

Polyzotis section 4.2.1, first paragraph, describes a method of determining the selectivity of a particular “simple label path”. Specifically, the cited portion of Polyzotis explores using a system called XSketch to determine the estimated number of elements “discovered by” a simple label path, which is the selectivity of the path. This paragraph from Polyzotis goes into detail of how to use XSketch to determine this selectivity.

Notwithstanding the depth of the selectivity analysis in Polyzotis, the art fails to teach or suggest **each of** the “total number[s]” recited in the above-cited feature of Claim 40. Specifically, Claim 40 recites “gathering **each of** [(a)] a total number of nodes, in said hierarchy, that are accessible via a path through a specified node, [(b)] a total number

of containers, in said hierarchy, that are accessible via a path through said specified node, [(c)] a total number of nodes, in said hierarchy, that are accessible via a path through said specified node and that are in a level of said hierarchy that is immediately under a level of said specified node, and [(d)] a total number of containers, in said hierarchy, that are accessible via a path through said specified node and that are in a level of said hierarchy that is immediately under said level of said specified node.” Because all of the items listed in Claim 40, labeled (a)-(d) above, are not taught or suggested by Polyzotis, Claim 40 is patentable over the art. Reconsideration is respectfully requested.

Independent Claim 41 is the computer readable storage medium counterpart to Claim 40, and is thus patentable over the cited art for at least the same reasons as Claim 40. Reconsideration is respectfully requested.

III. CONCLUSIONS & MISCELLANEOUS

For the reasons set forth above, all of the pending claims are now in condition for allowance. The Examiner is respectfully requested to contact the undersigned by telephone relating to any issue that would advance examination of the present application.

A petition for extension of time, to the extent necessary to make this reply timely filed, is hereby made. If applicable, please charge our deposit account for the petition for extension of time fee. If any applicable fee is missing or insufficient, throughout the pendency of this application, the Commissioner is hereby authorized to charge any applicable fees and to credit any overpayments to our Deposit Account No. 50-1302.

Respectfully submitted,
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